ESD-Isolation Circuit Driving Gate of Bus-Switch Transistor During ESD Pulse Between Two I/O Pins

Abstract of Disclosure

A bus-switch transistor connects two I/O pins when an enable signal on its gate is activated. Each pin has an electro-static-discharge (ESD) protection devices. When the internal ground and the enable are floating, and an ESD pulse is applied between the two pins, an isolation circuit couples part of the ESD pulse to the gate of the bus-switch transistor, keeping the transistor turned off. This forces the ESD pulse to travel through the ESD protection devices, preventing damage to the bus-switch transistor. The isolation circuit has a capacitor between a pin and the gate of a coupling transistor. The capacitor couples the ESD pulse to the gate of the coupling transistor. The coupling transistor turns on, connecting the pin to the gate of a grounding transistor. The grounding transistor then turns on, connecting the gate of the bus-switch transistor to the other pin, which is grounded during the ESD test.

Figures